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# **Exploiting VAAs to Study the Dimensionality of the Policy Space: The Greek Case**

**Jonathan Wheatley, Fernando Mendez and Micha Germann**

## **Abstract**

This paper provides a critique of how VAAs map parties onto a multi-dimensional policy space. It argues that existing methods for defining ideological dimensions and mapping parties onto this space are based on an ex ante conception of what these dimensions are and often fail to capture the subtleties of how the political space is represented in the eyes of voters. Instead it suggests an inductive technique that uses data generated from VAA users to define the most pertinent dimensions and map the positions of party supporters. It applies this technique to data gathered from the Choose4Greece VAA, which was deployed prior to critical Greek elections in May and June 2012.

## Introduction

Recent scholarly work on VAAs has focussed on issues relating to their design and application, rather than their potential as a research tool. However, given that they can generate very large datasets that contain the policy preferences of a large number of users, VAAs provide an immense source of empirical data that could be of great interest to students of political behaviour. This paper looks at ways to exploit VAA-generated data in order to identify latent ideological dimensions and then map political parties on an ideological policy space. It also looks at whether such methods could help us improve on existing methods of party mapping that are used in VAA design.

Many VAAs<sup>1</sup> produce as an output a two dimensional map in which the user's position is compared with that of each party (or candidate). Typically the two dimensions that define the map consist of one dimension that separate the Right of the political spectrum from the Left in economic terms and another that divides social liberals from social conservatives. Put differently, the first dimension typically refers the role of the state in the economy, while the second refers to issues relating to culture, morality, traditions and national identity. The second dimension has been referred to as the the GAL-TAN dimension, with GAL representing green / alternative / libertarian values and TAN representing traditionalism / authority / nationalism (Marks et al., 2006). In the visual output that users receive from such VAAs, both users and parties are placed at appropriate positions on the map. In order to generate the map each issue statement is first usually coded in terms of which dimension it belongs. Parties (or candidates) are also coded, either by experts or by party representatives (or candidates) themselves, with respect to each issue statement and placed on the map. By definition, the coding of issue statements must be carried out *ex ante*; first, assumptions are made *a priori* about what ideological

<sup>1</sup> Such as those designed by the team at c2d in Aarau, Switzerland, jointly with Cyprus University of Technology, as well as the Dutch application, Kieskompas.

dimensions exist in a given context, and then a decision is made, typically by experts, about what issues load onto these dimensions.

But are these assumptions justified? What evidence do we have that in a particular national context Left-Right and GAL-TAN are the only main dimensions in the political space? This is, in fact, a major consideration not only for VAA designers but for all researchers who are interested in defining and measuring ideological dimensions and/or mapping parties or individuals with respect to these dimensions. Many endeavours in this direction similarly define ideological dimensions *ex ante* and then rely on experts to define the issues that load onto each scale and determine party positions (Castles and Mair, 1984; Huber and Inglehart, 1995; Benoit and Laver, 2006).

Another, more inductive, approach is also possible. Issues can be selected so as to reflect as widely as possible the most salient debates in a polity and dimension reduction techniques and/or scaling techniques can be applied to respondents' attitudes to these issues *ex post* in order to determine what are the most salient dimensions in that particular context. This approach contrasts with the traditional approach both in that it is inductive, rather than deductive, and because its focus is on citizens, rather than elites. In terms of party mapping the deductive approach is often used to map the official policy positions of parties, as articulated by their elites, while the inductive approach can be used to determine the positions of party supporters with respect to the dimensions that emerge from citizens' opinion (Wheatley et al. 2012).

This paper will focus on Choose4Greece, a VAA that was employed before the parliamentary elections in Greece that were held on 6 May 2012 and the repeat elections held on 17 June 2012. The VAA was designed in such a way that two ideological dimensions were defined *a priori* and parties were placed

on the corresponding two-dimensional map based on how they had been coded by groups of experts. Choose4Greece attracted 92,006 users in the run-up to the May elections and 9,543 users before the repeat elections. After the data generated from the VAA was cleaned to remove possible bogus entries<sup>2</sup>, there remained 75,294 valid entries from the first round and 6,905 valid entries from the second round.

The paper will proceed in the following way. First, we will briefly describe the Choose4Greece application, before exploring how the VAA designers defined the most pertinent ideological dimensions, how the parties were coded and how the codes given to each party determined its position on the ideological map that was presented to the users of the VAA. We will then explore whether or not the dimensions defined are valid. Next, we will attempt to identify latent dimensions *a posteriori* from data generated from users' responses to the issue statements and then examine how users who defined themselves as party supporters can be placed with respect to these dimensions. In such a way we will develop an alternative method of party mapping to that deployed in the VAA design. Finally, we will compare the two methods of dimension analysis and party mapping and, in conclusion, make suggestions as to how the inductive approach could be used to improve the design of VAAs as well as provide us with valuable insights about the political space.

### *Choose4Greece*

Respondents who filled in the Choose4Greece application were asked to give their opinion on a set of thirty policy statements that were designed by local experts to reflect the most salient political issues of the time and to cover a wide range of issue topics, including economic policy, law and order,

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<sup>2</sup> The data was cleaned by excluding the following entries: 1) all cases in which the time taken to complete the 30 issue statements was less than 120 seconds; 2) all cases in which the time to respond any one issue statement was less than two seconds; 3) all cases in which the time taken to respond to three or more issues statements was less than 3 seconds; 4) all cases in which the respondent answered fifteen successive issue statements in the same way. Finally, to make provisions for cases in which an individual completes a questionnaire more than once, a filtering technique was used to identify multiple entries from the same computer, which were then removed

immigration, defence, the environment and foreign policy. After the May elections, seven issue statements were replaced by new statements, ten were adapted, thirteen remained unchanged and the VAA was relaunched in time for the June elections. In both experiments respondents were offered a five-point scale for each policy statement containing the options: “Completely Agree”, “Agree”, “Neither Agree nor Disagree”, “Disagree”, and “Completely Disagree”. In addition a user could indicate “No Opinion”. Respondents were also asked to provide additional details, such as age, sex, party affiliation and voting intention. For party affiliation, the option “none” was always available, while for voting intention, the options “I have not decided yet” and “I do not intend to vote” were available. Respondents were also asked why they intended to vote for their party or candidate of choice, and one of the options available was identification with the party's political programme. For both elections (in May and June) respondents were asked how they voted in the 2009 parliamentary elections, while prior to the June elections, they were also asked how they had voted the previous month.

Each party was coded by five experts independently on each of the thirty policy statements. During the first round of coding these experts noted their codes for the party, together with their reasons for coding and weblinks to sources from which they had derived their information. All this information was entered onto an interactive platform known as Delphi (see <http://armstrong.wharton.upenn.edu/delphi2/unauthorized.php>). In subsequent rounds, each coder was able to see the reasons and weblinks provided by the other experts to justify their codes and were given the opportunity to change them if they were convinced by the others' arguments. In this way differences between experts' codes were smoothed out and a final set of codes for each party was agreed upon. For the May elections, twelve parties were coded: New Democracy (ND), the Coalition of the Radical Left (SYRIZA), the Panhellenic Socialist Movement (PASOK), the Independent Greeks (ANEL), the

Democratic Left (DIMAR), the Communist Party of Greece (KKE), the Popular Orthodox Rally (LAOS), the Democratic Alliance (DISY), the Ecologist Greens (OP), Recreate Greece (Dimiourgia Xana), DRASI and the Anticapitalist Left Cooperation for the Overthrow (ANT.AR.SY.A.). For the June elections, DISY was not coded, because it had joined a coalition with New Democracy and was not participating in the elections independently, while the neo-Nazi Golden Dawn (Chrysi Avgi), was coded because of its strong showing in the May elections.

Two ideological scales were then defined: one broad Left-Right scale and one scale based on attitudes towards the memoranda with the IMF/EU/ECB that impose swingeing cuts in public expenditure in return for EU bailout funds. This second dimension was seen to be crucial, given that the Greek public was divided between those who are prepared to accept the memoranda in return for EU support and those who would reject the terms. Based on parties' codes with respect to the thirty issue statements, each party was located at the appropriate point on the two-dimensional map. For the May elections, fourteen issues statements were deemed to load onto the Left-Right dimension, while fourteen issues were placed on the pro-/anti-memorandum dimension. Two issues were not deemed to load onto either dimension. For a list of issue statements and their (a priori) loadings onto each dimension, see Table 1. For the June elections the same ratio of fourteen-fourteen-two was preserved even though some of the issue statements had been replaced or changed. A statement for which agreement was deemed to place the user on the Right was given a score of  $X$ , a statement for which agreement was deemed to place the user on the Left was given a score of  $-X$ , a statement for which agreement was deemed to place the user in the pro-memorandum camp was given a score of  $Y$ , while a statement for which agreement was deemed to place the user in the anti-memorandum camp was given a score of  $-Y$ . Based on their codes, Figure 1 shows how parties were located with respect to the two axes prior to the May elections, while Figure 2 shows their positions based on the issue statements used for the June elections.

But are the dimensions that were defined *a priori* empirically valid? Specifically, are users' responses to issue statements that have been grouped together as belonging to the same dimension sufficiently consistent to justify their grouping, and are the two dimensions identified sufficiently independent to count as separate from one another? In order to assess whether each of the two scales identified (Left-Right and pro- versus anti-memoranda) are consistent and can therefore be considered unidimensional (or homogeneous), we apply a graphical technique that, while not a formal test, allows for an intuitive investigation of a scale's internal consistency. The approach builds on the central assumption that each item of a Likert scale is an ordinal-level function of the latent trait this scale aims to measure. It follows that if a Likert scale in fact measures a single common latent variable (and is thus internally consistent), each item must be monotonically related to all other items (Jacoby 1991). This means that, as the score of the latent trait increases, so should the score of each single item, and vice versa. Whether there are in fact such monotone relationships can be examined graphically by plotting each single item of a scale against the sum of all remaining items (i.e., the restscore), using locally adjusted (lowess) regression curves (for a more detailed description of this approach cf. Dinas and Gemenis 2010).<sup>3</sup> A scale can be considered internally consistent if the lowess curve of each item increases monotonically with the restscore.

Figures 3 and 4 show the respective plots for the ex-ante defined Left-Right and memoranda scales based on users' response data extracted from Choose4Greece in the run-up to the May elections. Before carrying out the tests the polarity of those questions coded as “-X” and “-Y” in Table 1 were reversed, so that for all items a higher score represented either a more right-wing attitude or a more pro-memoranda attitude. The two scales present a mixed picture. While most items in each scale increase

<sup>3</sup> We use locally adjusted regression instead of item-rest correlations because there needs not be a linear relationship between a specific item and the latent trait.



monotonically with the respective restscores, a number of items introduce a degree of internal heterogeneity into the scales. In particular, at least three out of the fourteen items forming the Left-Right scale (6, 26, and 29) are not monotonically increasing with the restscores, while in case of the memoranda axis, five out of the fourteen items seem to have only a weak monotone relationship with the latent trait (17, 18, 19, 20 and 30).

If we return to Table 1 and look at the way each item was deemed to belong to one or other dimension, we see that the Left-Right dimension (designated “X”) appears to contain both items that load onto what we could describe as an “economic” understanding of Left and Right and others that appear to reflect a cultural divide similar to what we described earlier as the GAL-TAN dimension earlier in the paper. Thus, Items 1, 2, 12 and 13 refer to the gap between rich and poor and the role of the state in taxing and providing services, while many of the other Items that are defined as Left-Right items refer to more “cultural issues” such as crime (Item 6), immigration (Item 9), multiculturalism (Item 10) and religion (Item 26). If we look at Figure 2, we see that the neo-Nazi Golden Dawn was placed even slightly to the “left” of the mainstream New Democracy with respect to this dimension prior to the June elections, despite its overtly racist and xenophobic views. Moreover, the memoranda dimension (designated “Y”) is also very much about the way the economy is run, leading us to hypothesis that the two dimensions may, in fact be strongly interrelated with one another. Calculating users' scores with respect to the two ex ante dimensions by summing their responses to the individual items that belong to each scale (and reversing polarity when necessary), we find that the two sets of scores correlate with a Pearson's  $r$  of 0.489.

### *Identifying and Measuring the Latent Political Dimensions*

Having established the problematic nature of the ex-ante defined scales in terms of internal validity and interdependence, we now adopt inductive techniques of dimension analysis and scale construction to attempt to derive dimensions from the users' data. As the very nature of an inductive approach implies that we do not make any a priori assumptions about the dimensionality of the political space, the key challenge of this inductive scaling exercise lies in the identification of the number and substance of the latent dimensions (Benoit and Laver 2012).

To get a first feel for the dimensionality of the political space, we apply exploratory factor analysis (Thurstone 1947). Compared to other popular latent variable techniques, factor analysis seems advantageous as it allows for a relatively straightforward identification and labelling of latent dimensions. We base the factor analysis on polychoric correlations to do justice to the ordinal nature of the items. For the May data, a total of 51,041 entries, based on responses from all users with complete answer sets to all 30 policy questions, are included. For the June data, 5,244 users have complete answer sets. As a first step, we need to establish the number of dimensions in the political space, i.e., in methodological language, the number of factors to retain for rotation. A common practice is to employ the Kaiser criterion and to extract all factors where the amount of explained variance (the Eigenvalue) exceeds one. However, there exists broad consensus that the application of the Kaiser criterion is inadvisable as it often leads to the extraction of too many factors (Velicer and Jackson 1990). Thus, we use the scree test, which involves an examination of the graph of the eigenvalues against their serial order. We are looking for the so-called “elbow”, i.e., the break point in the data after which the curve flattens out, and then keep the number of factors above the elbow (Costello and Osborne 2005). For both the May and the June data the screeplots suggest that this break happens at the third factor, and thus that the Greek political space in 2012 is best described as two-dimensional (see Figures 5 and 6). While the May data would suggest that the first dimension is much stronger than the second, the June

data appears to show two equally strong dimensions. However, as we shall argue below, this is most likely the result of statement selection.

Table 3 shows the respective two-dimensional orthogonal varimax rotated factor loadings matrix on each of the 30 issue statements for the May data, while Table 4 shows the corresponding loadings for the June data. Compared to the ex-ante defined dimensions, the extracted factors more closely resemble the common conception of an ideological space defined by one (economic) Left-Right dimension and one cultural dimension. For the May data, many items load strongly ( $>0.4$  or  $<-0.4$ , marked in bold in Table 3) on the first factor. These include a number of items that had been placed on the ex ante Left-Right scale, such as Items 1, 2, 12 and 13, as well as almost all of those that belonged to the ex-ante memoranda scale (all except Item 21). Only six items load strongly onto the second, “cultural” dimension: Item 6 (on policing), Item 9 (on immigration), Item 10 (on multiculturalism), Item 23 (on drugs policy), Item 24 (on defence) and Item 29 (on Macedonia). For the June data a similar pattern emerges, although somewhat more items load onto the second dimension. All fourteen items that were placed ex ante on the memorandum dimensions load onto the (economic) Left-Right dimension as well as four items that were placed on the ex ante Left-Right dimension (Items 3, 9, 15 and 19). Eight items now load onto the second, cultural dimension, probably because more “cultural” items were included in the questionnaire. These include two items on immigration (Items 8 and 10), one on policing (Item 7), one on multiculturalism (Item 11), one on religion (Item 12), one on gay rights (Item 13), one on soft drugs (Item 14) and one on defence (Item 18). Looking at the cultural dimension, it would appear to be defined to a large extent by elements of national identity; in Greece not only matters of immigration and multiculturalism, but also issues of religion and defence can also be seen through the prism of fostering and protecting Greek national identity.

As a second step, we look at whether or not the two dimensions that we have identified form the basis for unidimensional scales. In order to do so, we adopt a technique from the repertoire of item response theory (IRT): Mokken scale analysis (Mokken 1971). The Mokken model is a probabilistic expansion that was originally developed for dichotomous items; however, it has been extended to ordered polytomous items (Molenaar 1991). The Mokken scaling procedure can basically be described as a stepwise bottom-up search procedure for indicators of the same latent trait, whereby the selection of items into unidimensional scales relies on Loevinger's  $H$  coefficient of homogeneity (van Schuur 2003). To be considered a Mokken scale, the items need to have sufficiently high homogeneity (the value of Loevinger's coefficient for each item,  $H_i$ , should be at least 0.3), it should increase monotonely to a sufficient extent<sup>4</sup>, and finally, all respondents should more or less agree on the "level of difficulty" of the item, or in this case how right-wing or left-wing (or nationalist) you need to be in order to answer an item in a particular way (van Schuur 2011: 69).<sup>5</sup>

Since the Mokken procedure requires that all components of a latent trait point in the same direction, we included all items both in original and reversed order. Consistent with the factor analysis, two Mokken scales were identified with a minimum threshold value of 0.3 for  $H_i$ . We then excluded all ambiguous items, i.e., items that are attributable to more than one latent trait. The reason for this lies in the nature of the Mokken scaling procedure, which will, if the chosen threshold value is met, attribute ambiguous items to whatever scale is constructed first – and thus naturally neglect that they could also be part of another, later formed scale. Leaving out the ambiguous items should accordingly minimize threats to internal consistency.

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<sup>4</sup> In the R software environment for statistical computing and graphics, the test **check.monotonicity** was used to check for violations of this principle.

<sup>5</sup> In the R software environment for statistical computing and graphics, the tests **check.iio** and **check.pmatrix** were used to check for violations of this principle.

The two Mokken scales derived from the May and June data are shown in Tables 5 and 6 respectively. While a number of items that appeared to load strongly onto the two dimensions identified above by means of factor analysis do not appear in the Mokken scales, the fundamental nature of the scales is the same: one scale consists of items relates strongly to economic issues, most notable the memorandum, and one scale relates to cultural issues, many of which are related to national identity.

As a third step, we calculate users' positions with respect to the two latent scales that we have just defined through Mokken Scale Analysis by summing their responses to the individual items that load onto each scale and reversing polarity of each item when necessary. We then normalize the scores in such a way that a score of 1 on the first (economic) dimension represents an economic right-wing and pro-memorandum position, while a score of 0 represents an economic left-wing and anti-memorandum view. We also normalize the cultural dimension so that 1 represents an authoritarian, nationalist, and anti-immigration position, while 0 represents the opposite (socially libertarian and cosmopolitan). In order to check how inter-dependent these two dimensions are, we carry out a bivariate correlation between the two dimensions. For the May data, Pearson's  $r$  comes to 0.038, for the June data 0.031. This suggests that the method of deriving latent dimensions from the data generates much more orthogonal dimensions than the ex ante method.

Finally, we attempt to form groups of users that can be considered supporters of the main political parties and plot each group on a two dimensional map defined by the two latent dimensions that we derived from the data. We only consider those parties that achieved at least 3% in the two elections, which leaves us with just seven parties: New Democracy, SYRIZA, PASOK, ANEL, Golden Dawn, DIMAR and the KKE. For the May dataset, we defined party supporters as those who: a) identified with a particular party, b) intended to vote for that party and c) claimed to vote for the party because

they identified with the party's political programme. For the June dataset, the criteria were made slightly less restrictive because of the lower numbers of respondents. While criteria a) and b) were retained, criterion c) was replaced by the criterion that the user must have voted for the same party in the May elections.

The means and standard deviations of each group of party supporters with respect to the two axes are shown in Tables 7 and 8 and in diagrammatic format in Figures 7 and 8. Note that the supporters of the two former dominant parties, New Democracy and PASOK, both stand on the Right economically, reflecting their pro free-market policies and their support for the memorandum. However, they differ in terms of the “cultural” aspect in that New Democracy supporters tend to be more nationalist and in favour of defence and law and order, while PASOK supporters are less nationalist and more libertarian. This conforms to PASOK's identity as a “left-wing” party if the terms “left” and “right” are extended to embrace cultural issues as well. Supporters of the new right-wing party, the Independent Greeks (ANEL), which broke away from New Democracy over the memoranda, take a similar position to supporters of their former party on cultural issues, but take a more “left wing” standpoint on economic issues, as a result of their anti-memorandum views. The new left-wing challenger, the Radical Left coalition (SYRIZA), appears on the left in economic terms and strongly on the libertarian side in terms of cultural issues. The Greek Communist Party (KKE), while further to the left even than SYRIZA on economic issues, adopts a somewhat more moderate position on cultural issues. The centre ground on the economy is occupied by supporters of the Democratic Left (DIMAR), who also take a libertarian stance on cultural issues, which is unsurprising as many are disillusioned former supporters of PASOK. Finally Golden Dawn supporters are distinguished by their extreme position on the cultural authoritarian pole, which is to be expected given the nature of their party. The current method mapping parties inductively from latent trends extracted from the data thus reveals a characteristic of this party

that was not revealed by the ex ante mapping (see above).

The method described above thus seems to position the parties rather well in comparison with the ex ante method described earlier in the paper. Moreover, if we compare Figures 7 and 8, we see that the positions of party supporters based on the June data are very similar to the positions extracted from the May data despite the fact that they are based on a number of different issue statements. This would appear to indicate that our mapping technique is rather robust.

### *The Issue of Representativeness*

However, one question that remains is whether or not our inductive insights can be applied to the Greek political space as a whole. Despite their relatively large number, the users of Choose4Greece were self-selected and disproportionately young, urban and educated. Moreover, they tended to be left-wing, with a predominance of SYRIZA supporters over all others (see Tables 7 and 8) and rejected the two dominant parties (New Democracy and PASOK) even more comprehensively than the rest of the population. Can we therefore extrapolate our findings from such a self-selected group to the population as a whole?

One technique we could use to test this would be to weight our entries in order to give extra weight to those who belong to under-represented groups through the use of techniques such as raking (Deville, Särndal and Sautory: 1993). However, we reject this approach, because the very few eighty-something, uneducated, rural inhabitants who filled in the survey will be so atypical of their demographic group that to give such individuals very large weights (as would occur in a raking procedure) risks skewing the group even further from the norm than it was at the beginning. Instead we try a different technique.

We take the largest (May) dataset and divide it into groups according to respondents' answers to a supplementary question that was used in Choose4Greece: How did you vote in the 2009 national elections? Twelve groups were created according to their answers to this question: former supporters of PASOK, New Democracy, KKE, LAOS, SYRIZA, OP, ANT.AR.SY.A., Golden Dawn, as well as those who voted for other parties, cast a blank vote, invalidated their ballot papers and did not vote (this last group was selected only from those born before 1991 or earlier who had had the opportunity to vote). These groups were then sampled randomly in such a way that the number of respondents sampled from each group corresponded to the relevant party's vote share in the 2009 elections.

The newly-sampled group included 28,330 entries. While this group may not be fully representative, it is more representative than the original group, so that if our method of dimension extraction were sensitive to unrepresentative sampling, we would expect that if we applied the above analysis to our new group, we would discover significant differences from the results obtained from the old group. Applying exploratory factor analysis on polychoric correlations generated from the new dataset, as before, we once again obtain a two-dimensional solution (see the scree plot in Figure 9) and the loadings of each question onto each dimension are very similar to before (compare Table 9 with Table 3). In fact those items marked in bold in Table 9 (with loadings of  $>0.4$  or  $<-0.4$ ) are exactly the same as those marked in bold in Table 3. Similarly exactly the Mokken scales identified earlier (see Table 5) were also valid for the new sample (see Table 10). This suggests, once again, that our method is robust.

### *Conclusion*

This paper's main objective was to examine the validity of the dimensions ex-ante defined by the Choose4GreeceVAA research team. With regard to this design aspect of a VAA, researchers may certainly have a good a priori idea of what type of dimensions are likely to emerge and the n



dimensionality of the political space. However, in the absence of a pre-trial on a representative sample, it is unlikely that VAA researchers will be able to correctly specify ex-ante all of the items loading onto a particular dimension. Furthermore, a VAA team may have some very good substantive reasons for introducing a new dimension into the political space. This was the case with the Choose4Greece. Indeed, these were no ordinary elections with the government having collapsed over the memorandum package. There were, therefore, good substantive reasons for introducing a 'memorandum' dimension into the VAA political mapping. We left all of these considerations to one side in this paper to focus on the inductive technique at the core of our empirical analysis.

The findings are generalisable beyond the specific Greek case. First, they show how VAA data can potentially be used to cast light on one of the core questions in political science: how is the political space structured in terms of ideological dimensions and where do parties fit within that space? Given that hitherto research on VAAs has mainly focussed on design aspects or behavioural aspects such as effects of VAA's on users, the use of VAAs as a data-gathering tool for mapping the political space is a new direction. Second, this research may also be pertinent to VAA design. The inductive approach to identifying policy dimensions may, in fact, derive more relevant dimensions than the ex ante approach. One possible design innovation that could be used in applications such as Choose4Greece in which users are mapped on a political space together with parties is to use the incoming data to adapt how the dimensions are defined. For example, after data from the first 5,000 respondents have been gathered, it may be possible to carry out a dimension analysis on the sample and alter from there the ex ante dimensions that have been used ex ante to define the political map.

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Figure 1: Placement of Parties on the ex ante Scale, May 2012

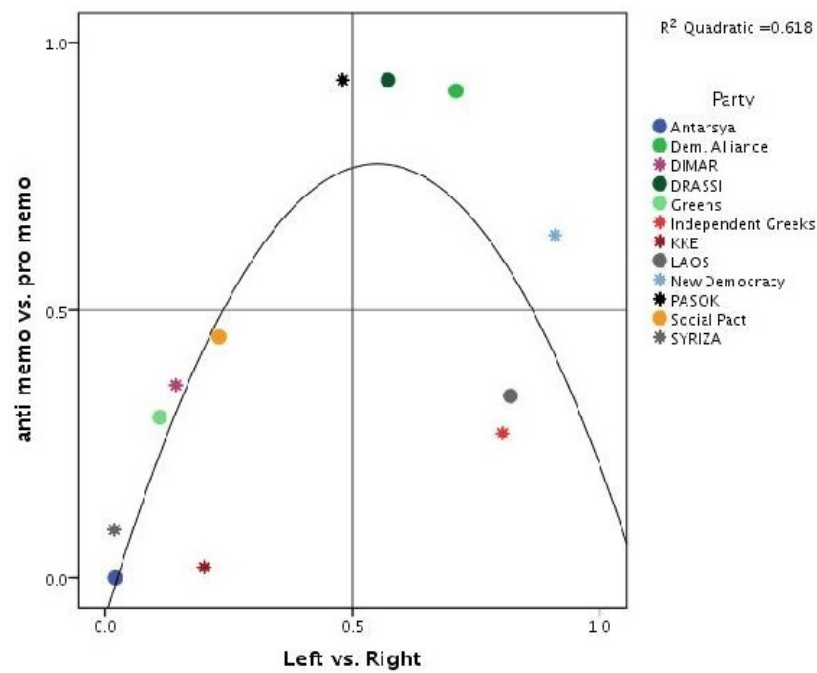


Figure 2: Placement of Parties on the ex ante Scale, June 2012



Figure 3: Internal Consistency of the Items on the Left-Right Scale (Restscore Method)

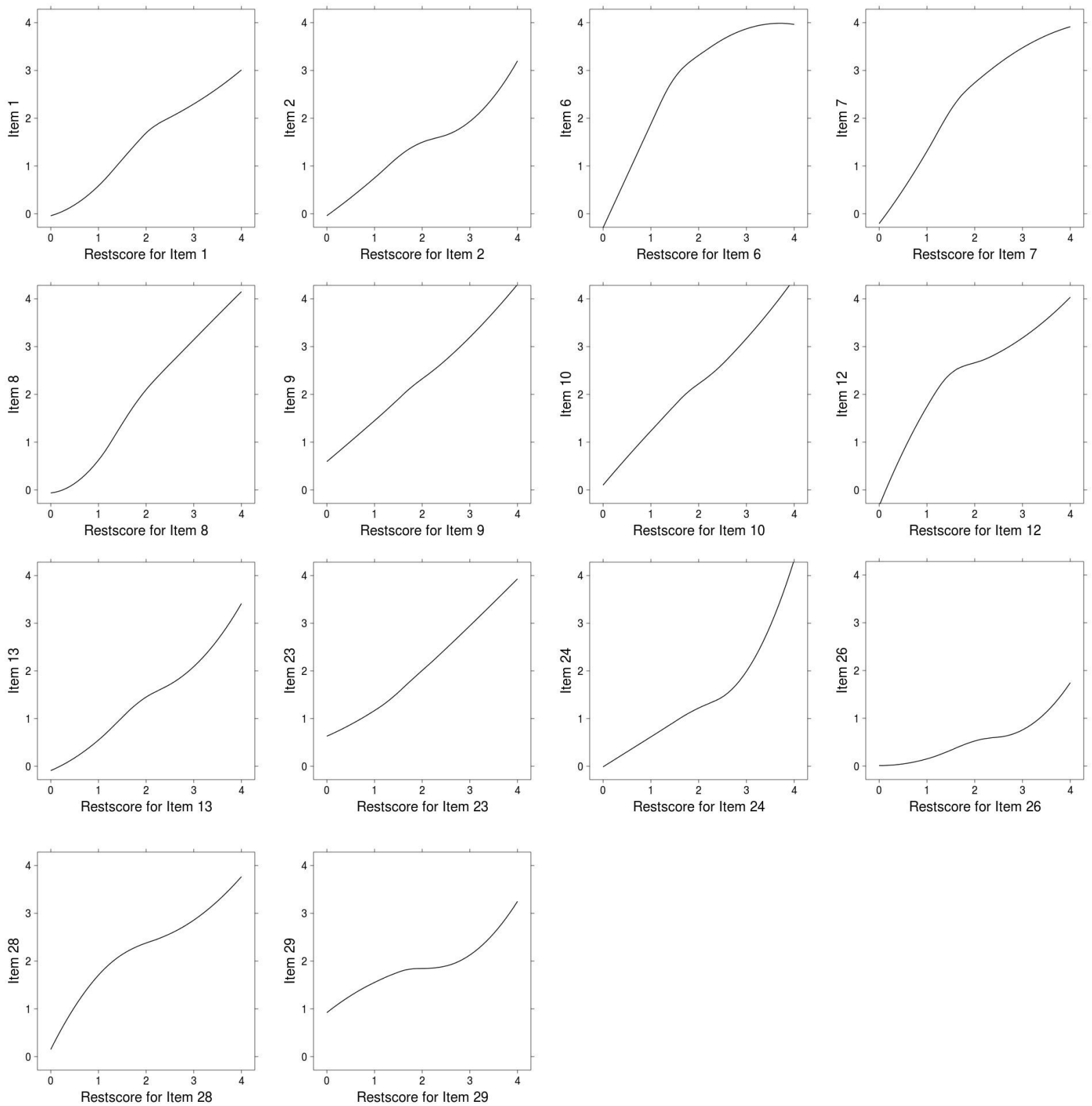


Figure 4: Internal Consistency of the Items on the Memoranda Scale (Restscore Method)

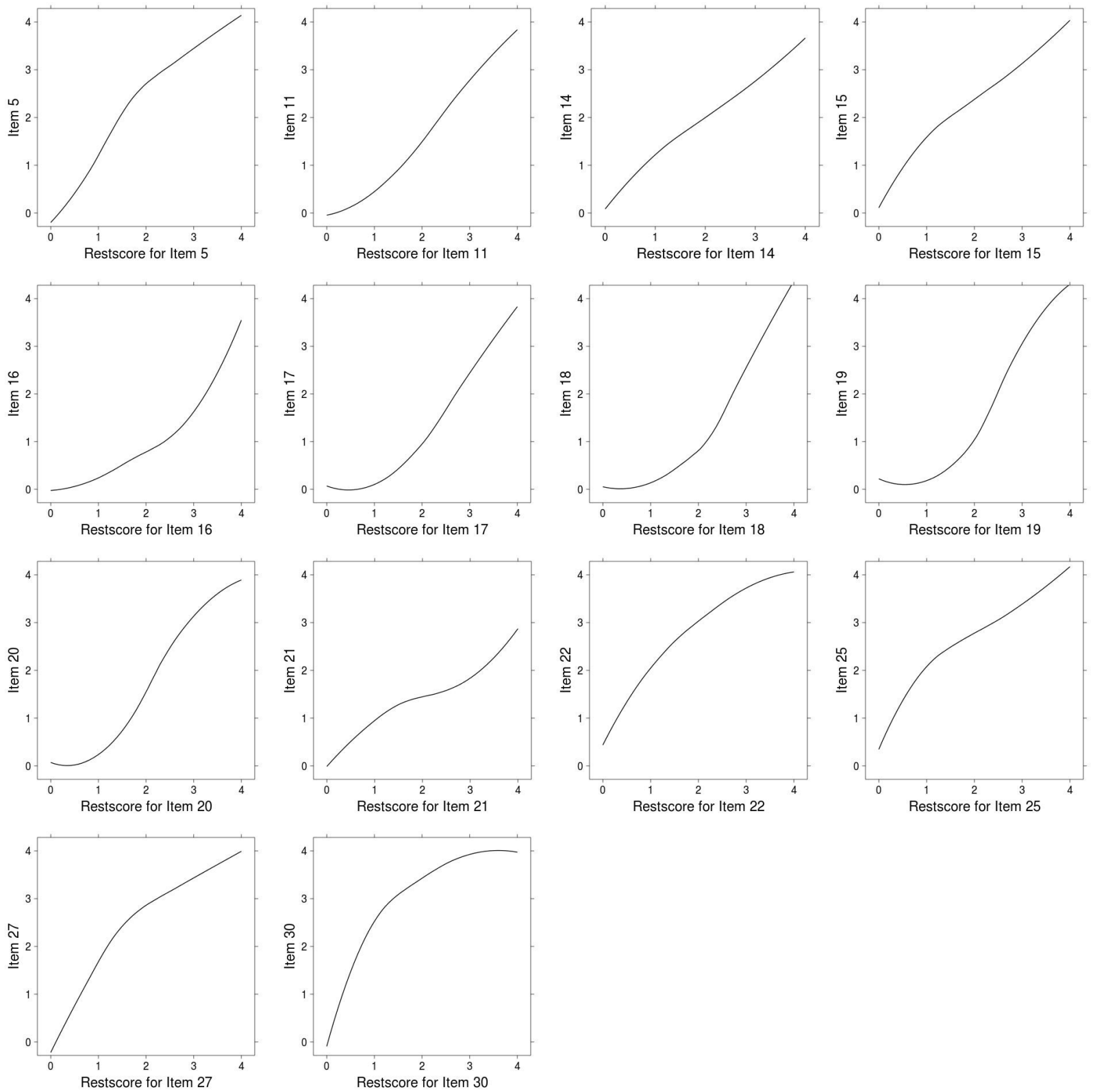


Figure 5: Screeplot for May Data

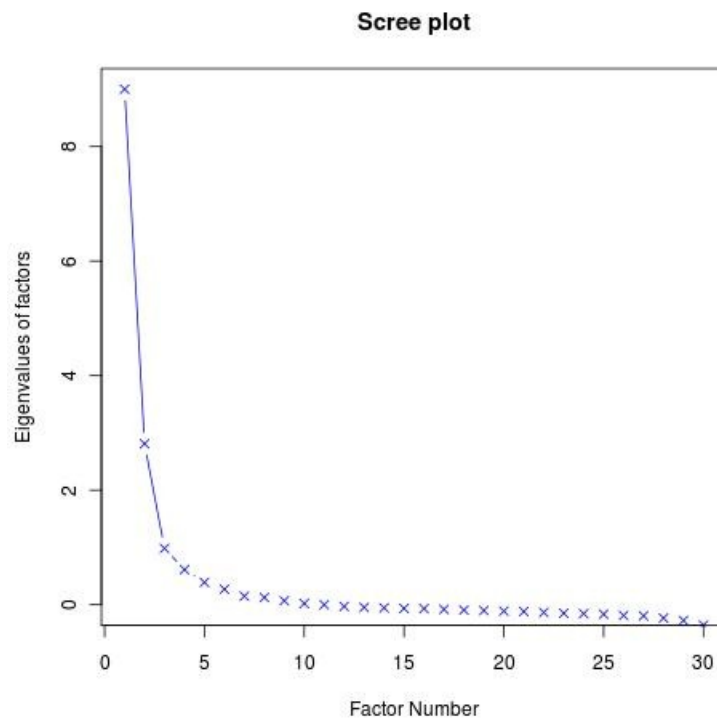


Figure 6: Screeplot for June Data

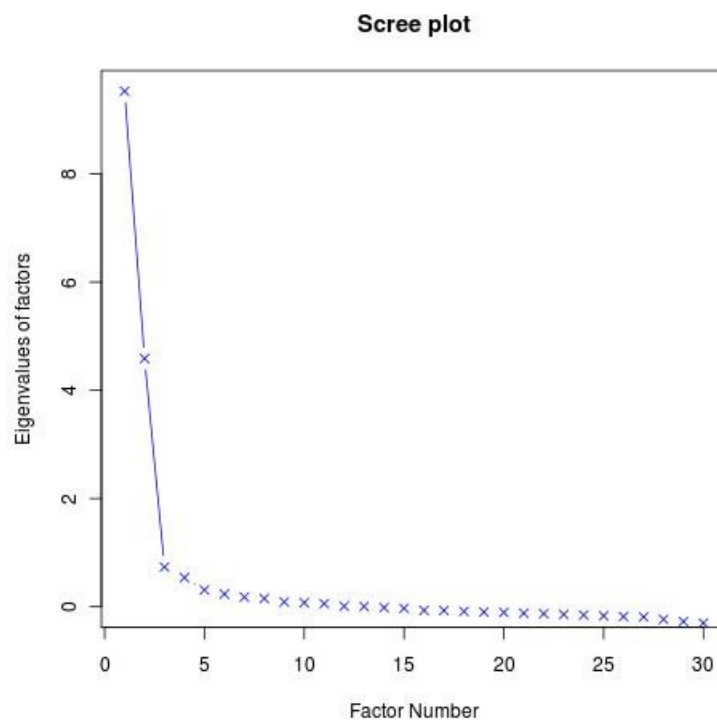


Figure 7: Positions of main parties with respect to two latent dimensions, May 2012

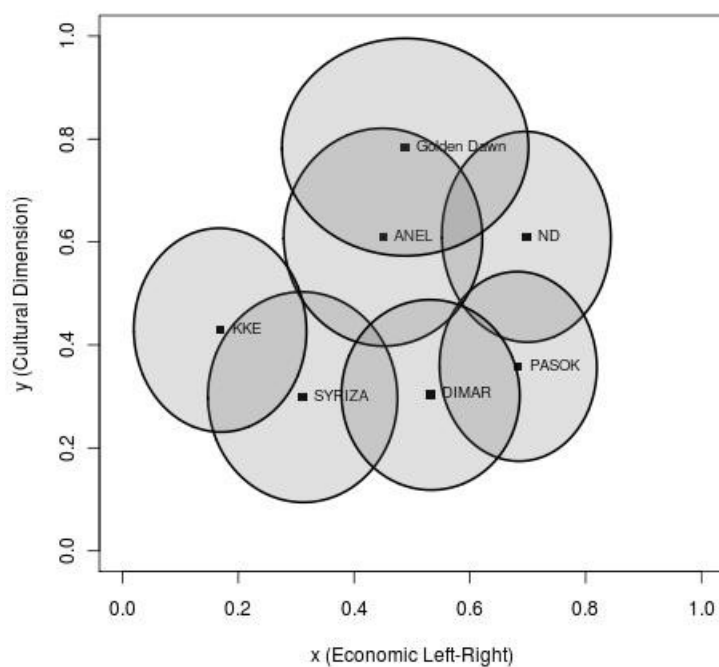


Figure 8: Positions of main parties with respect to two latent dimensions, June 2012

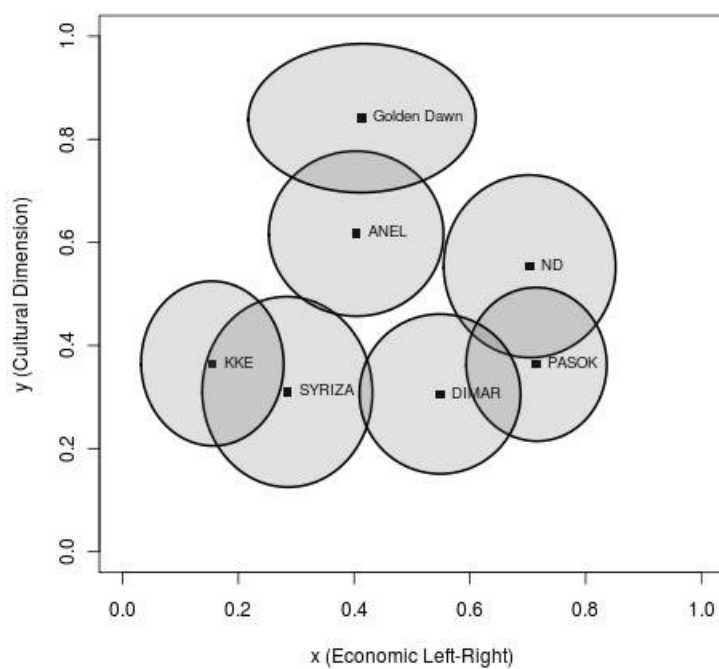
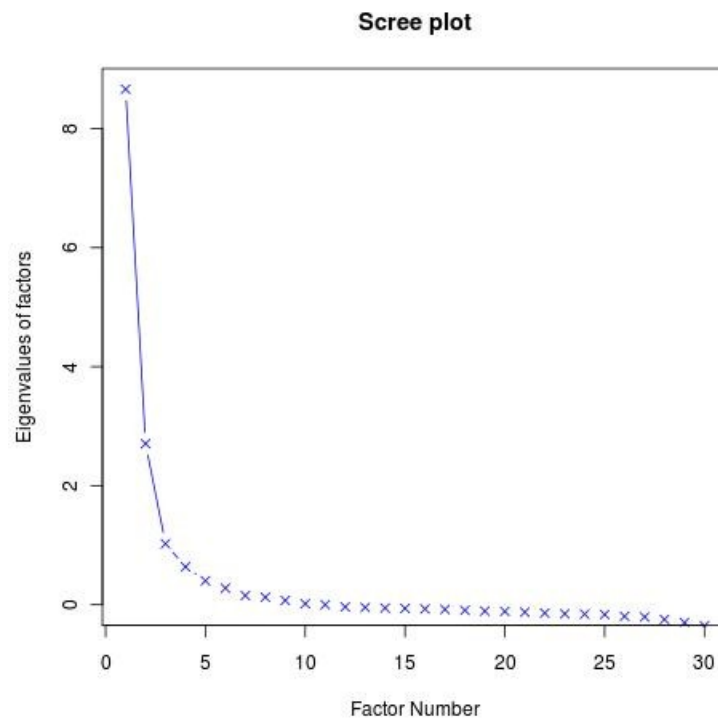




Figure 9: Screeplot for May Data (weighted)



**Table 1: May 2012, Ex ante Dimensions**

Item no.	Statement	Dimension
1	Priority should be given to economic growth even if this leads to a wider gap between rich and poor.	X
2	Taxes on large corporations should be increased.	-X
3	The extraction and exploitation of the mineral wealth of the country will lead to environmental degradation rather than contribute to economic growth.	0
4	The installation of solar panels on productive and fertile agricultural land should be prohibited.	0
5	Privatization will help reduce the deficit.	Y
6	Strong policing in town centers should be implemented to tackle crime.	X
7	The installation and use of closed circuit cameras in public places (e.g. shopping centers) should be prohibited.	-X
8	In order to maintain order in the cities, the state should take more restrictive measures on demonstrations.	X
9	Granting Greek citizenship on favorable terms to second generation immigrants will encourage further immigration to Greece.	X
10	Multiculturalism in Greece is a positive phenomenon.	-X
11	To combat unemployment, workers must accept the new forms of flexible working conditions (e.g. part time jobs).	Y
12	Co-funding the universities by private investors will have negative effects on higher education.	-X
13	The introduction of university fees will ensure a better functioning of the public university.	X
14	Merging smaller hospital and creating large hospitals will lead to a deterioration in the provision of health services.	-Y
15	It is possible to reorganize the public sector without dismissing civil servants.	-Y
16	Pay cuts are necessary for overcoming the crisis.	Y
17	The proper implementation of the IMF/EU/ECB memoranda will help Greece to overcome the financial crisis.	Y
18	The loans provided to Greece have only benefited the banks and lenders.	-Y
19	Signing the memoranda with the IMF/EU/ECB means selling out Greece to foreigners.	-Y
20	The second memorandum with the IMF/EU/ECB was necessary to prevent Greece from bankruptcy.	Y
21	The Inter-governmental Fiscal Treaty will not help Europe to overcome the crisis.	-Y
22	Greece's exit from the euro zone would help address the economic crisis.	-Y
23	Possession of soft drugs (such as marijuana) for personal use should be decriminalized.	-X
24	Reducing defence spending (e.g. closing military camps) will provide resources for the welfare state.	-X
25	Economic growth can be achieved by liberalizing all of the closed professions.	Y
26	Church property should be exempted from taxation so that the church can engage in charitable causes.	X
27	The participation of unelected technocrats in government is beneficial for the rehabilitation of the economy.	Y
28	Greece should strengthen its ties with Israel.	X
29	The name issue of the Former Yugoslav Republic of Macedonia (FYROM) should be resolved by Greece's acceptance of a composite name with a geographical qualifier.	-X
30	Greece should leave the European Union.	-Y

**Table 2: June 2012, Ex ante Dimensions**

Item no.	Statement	Dimension
1	To combat unemployment, workers must accept signing individual contracts	Y
2	It is necessary to streamline costs in the area of education, even if this means school mergers	Y
3	The financing of universities from private resources in higher education will reduce their independence	-X
4	The creation of large hospitals through mergers will lead to a deterioration of services (eg late treatment)	-Y
5	Is it possible to reorganize the public sector without the dismissal of civil servants	-Y
6	A decrease in salaries in the public sector is necessary for emerging from the crisis	0
7	There should be strict policing of city centers to tackle crime even if citizens are subject to increased controls	X
8	Immigrants without documents should be deported immediately from Greece	X
9	In order to maintain order in the cities, the state should take more restrictive measures on demonstrations	X
10	Immigrant children born in Greece should be allowed to obtain Greek citizenship	-X
11	The existence of multiculturalism in Greece is a positive phenomenon	-X
12	Believers in religions other than Christianity should have the right to build their own places of worship in Greece	-X
13	People of the same sex should have the right to sign a civil partnership	-X
14	Possession of soft drugs (such as marijuana) for personal use should be decriminalized	-X
15	Greece needs to strengthen economic ties with Israel even if it has a negative impact on the country's relations with Palestine	X
16	The name issue of the Former Yugoslav Republic of Macedonia (FYROM) should be resolved by Greece's acceptance of a composite name with a geographical qualifier	-X
17	Greece should require recognition of the Exclusive Economic Zone (EEZ) by Turkey	X
18	Greece must move to reduce its defense expenditure (e.g. by further closures of barracks)	-X
19	There is need to reduce the corporate tax to prevent capital flight to neighbouring countries	X
20	Priority should be given to economic growth even if this leads to a wider gap between rich and poor.	Y
21	The extraction and exploitation of the mineral wealth of the country will lead to environmental degradation rather than contribute to economic growth.	0
22	Privatization will help reduce the deficit.	Y
23	Economic growth can be achieved by liberalizing all of the closed professions.	Y
24	The termination of the terms of loan agreement (with the Troika) is a prerequisite for exit from the crisis	-Y
25	Signing the memoranda with the troika means selling out Greece to foreigners	-Y
26	The second memorandum with the IMF/EU/ECB was necessary to prevent Greece from bankruptcy.	Y
27	The policy of economic austerity, although hard, is essential to bring about development in Greece	Y
28	The return of the Greek national currency will contribute effectively to the exit from the crisis	-Y
29	The participation of unelected technocrats in government is beneficial for the rehabilitation of the economy	Y
30	Greece should leave the European Union	-Y

**Table 3: The Policy Space: Greece (May 2012)**

<b>Item</b>	<b>Question</b>	<b>Dim 1</b>	<b>Dim 2</b>
1	Priority should be given to economic growth even if this leads to a wider gap between rich and poor.	<b>0.613</b>	-0.212
2	Taxes on large corporations should be increased.	<b>-0.465</b>	0.103
3	The extraction and exploitation of the mineral wealth of the country will lead to environmental degradation rather than contribute to economic growth.	-0.262	0.332
4	The installation of solar panels on productive and fertile agricultural land should be prohibited.	-0.208	
5	Privatization will help reduce the deficit.	<b>0.715</b>	-0.161
6	Strong policing in town centers should be implemented to tackle crime.	<b>0.428</b>	<b>-0.618</b>
7	The installation and use of closed circuit cameras in public places (e.g. shopping centers) should be prohibited.	<b>-0.513</b>	0.388
8	In order to maintain order in the cities, the state should take more restrictive measures on demonstrations.	<b>0.694</b>	-0.291
9	Granting Greek citizenship on favorable terms to second generation immigrants will encourage further immigration to Greece.		<b>-0.573</b>
10	Multiculturalism in Greece is a positive phenomenon.		<b>0.759</b>
11	To combat unemployment, workers must accept the new forms of flexible working conditions (e.g. part time jobs).	<b>0.715</b>	
12	Co-funding the universities by private investors will have negative effects on higher education.	<b>-0.602</b>	0.137
13	The introduction of university fees will ensure a better functioning of the public university.	<b>0.586</b>	-0.140
14	Merging smaller hospital and creating large hospitals will lead to a deterioration in the provision of health services.	<b>-0.546</b>	
15	It is feasible to reorganize the public sector without dismissing civil servants.	<b>-0.498</b>	
16	Pay cuts are necessary for overcoming the crisis.	<b>0.624</b>	
17	The proper implementation of the IMF/EU/ECB memoranda will help Greece to overcome the financial crisis.	<b>0.815</b>	0.101
18	The loans provided to Greece have only benefited the banks and lenders.	<b>-0.792</b>	-0.151
19	Signing the memoranda with the IMF/EU/ECB means selling out Greece to foreigners.	<b>-0.792</b>	-0.313
20	The second memorandum with the IMF/EU/ECB was necessary to prevent Greece from bankruptcy.	<b>0.811</b>	0.101
21	The Inter-governmental Fiscal Treaty will not help Europe to overcome the crisis.	-0.367	
22	Greece's exit from the euro zone would help address the economic crisis.	<b>-0.633</b>	
23	Possession of soft drugs (eg, cannabis) for personal use should be decriminalized.		<b>0.537</b>
24	Reducing defence spending (e.g. closing military camps) will provide resources for the welfare state.		<b>0.561</b>
25	Economic growth can be achieved by liberalizing all of the closed professions.	<b>0.549</b>	
26	Church property should be exempted from taxation so that the church can engage in charitable causes.		-0.354
27	The participation of (non-MP) technocrats in the cabinet will lead to a better management of the economy.	<b>0.662</b>	
28	Greece should strengthen its ties with Israel.	<b>0.446</b>	-0.165
29	The name issue of the Former Yugoslav Republic of Macedonia (FYROM) should be resolved by Greece's acceptance of a composite name with a geographical qualifier.	0.257	<b>0.453</b>
30	Greece should leave the European Union.	<b>-0.700</b>	

**Table 4: Exploratory Factor Analysis. The Policy Space, June 2012**

<b>Item</b>	<b>Question</b>	<b>Dim 1</b>	<b>Dim 2</b>
1	To combat unemployment, workers must accept signing individual contracts	<b>0.715</b>	
2	It is necessary to streamline costs in the area of education, even if this means school mergers	<b>0.701</b>	
3	The financing of universities from private resources in higher education will reduce their independence	<b>-0.591</b>	
4	The creation of large hospitals through mergers will lead to a deterioration of services (eg late treatment)	<b>-0.635</b>	
5	Is it possible to reorganize the public sector without the dismissal of civil servants	<b>-0.562</b>	
6	A decrease in salaries in the public sector is necessary for emerging from the crisis	<b>0.590</b>	
7	There should be strict policing of city centers to tackle crime even if citizens are subject to increased controls	<b>0.489</b>	<b>-0.545</b>
8	Immigrants without documents should be deported immediately from Greece	0.310	<b>-0.734</b>
9	In order to maintain order in the cities, the state should take more restrictive measures on demonstrations	<b>0.693</b>	-0.292
10	Immigrant children born in Greece should be allowed to obtain Greek citizenship		<b>0.732</b>
11	The existence of multiculturalism in Greece is a positive phenomenon		<b>0.808</b>
12	Believers religions other than Christianity should have the right to build their own places of worship in Greece		<b>0.771</b>
13	People of the same sex should have the right to sign a civil partnership		<b>0.709</b>
14	Possession of soft drugs (such as marijuana) for personal use should be decriminalized		<b>0.525</b>
15	Greece needs to strengthen economic ties with Israel even if it has a negative impact on the country's relations with Palestine	<b>0.564</b>	-0.120
16	The name issue of the Former Yugoslav Republic of Macedonia (FYROM) should be resolved by Greece's acceptance of a composite name with a geographical qualifier	0.199	<b>0.578</b>
17	Greece should require recognition of the Exclusive Economic Zone (EEZ) by Turkey		-0.353
18	Greece must move to reduce its defense expenditure (e.g. by further closures of barracks)		<b>0.603</b>
19	There is need to reduce the corporate tax to prevent capital flight to neighbouring countries	<b>0.594</b>	-0.236
20	Priority should be given to economic growth even if this leads to a wider gap between rich and poor.	<b>0.646</b>	-0.158
21	The extraction and exploitation of the mineral wealth of the country will lead to environmental degradation rather than contribute to economic growth.	-0.265	0.302
22	Privatization will help reduce the deficit.	<b>0.796</b>	
23	Economic growth can be achieved by liberalizing all of the closed professions.	<b>0.617</b>	
24	The termination of the terms of loan agreement (with the Troika) is a prerequisite for exit from the crisis	<b>-0.768</b>	
25	Signing the memoranda with the troika means selling out Greece to foreigners	<b>-0.809</b>	-0.296
26	The second memorandum with the IMF/EU/ECB was necessary to prevent Greece from bankruptcy.	<b>0.837</b>	0.125
27	The policy of economic austerity, although hard, is essential to bring about development in Greece	<b>0.756</b>	
28	The return of the Greek national currency will contribute effectively to the exit from the crisis	<b>-0.680</b>	
29	The participation of unelected technocrats in government is beneficial for the rehabilitation of the economy	<b>0.698</b>	
30	Greece should leave the European Union	<b>-0.730</b>	

**Table 5: May 2012, Mokken Scales for ex post Dimensions with Scalability Coefficients (H<sub>i</sub>)**

<b>Item</b>	<b>Question</b>	<b>Scales</b>	
		<b>1</b>	<b>2</b>
5	Privatization will help reduce the deficit.	0.460	
8	In order to maintain order in the cities, the state should take more restrictive measures on demonstrations.	0.455	
10	Multiculturalism in Greece is a positive phenomenon.		0.391
11	To combat unemployment, workers must accept the new forms of flexible working conditions (e.g. part time jobs).	0.428	
13	The introduction of study fees will ensure better functioning of the public university.	0.388	
22	Greece's exit from the euro zone would help address the economic crisis.	0.352	
23	Possession of soft drugs (such as marijuana) for personal use should be decriminalized.		0.373
24	Reducing defence spending (e.g. closing military camps) will provide resources for the welfare state.		0.399
27	The participation of unelected technocrats in government is beneficial for the rehabilitation of the economy.	0.434	
<b>Overall scalability coefficient (H) for each scale</b>		<b>0.421</b>	<b>0.387</b>

**Table 6: June 2012, Mokken Scales for ex ante Dimensions with Scalability Coefficients ( $H_i$ )**

Item	Question	Scales	
		Dim 1	Dim 2
1	To combat unemployment, workers must accept signing individual contracts	0.506	
2	It is necessary to streamline costs in the area of education, even if this means school mergers	0.477	
8	Immigrants without documents should be deported immediately from Greece		0.431
9	In order to maintain order in the cities, the state should take more restrictive measures on demonstrations	0.474	
10	Immigrant children born in Greece should be allowed to obtain Greek citizenship		0.442
12	Believers religions other than Christianity should have the right to build their own places of worship in Greece		0.488
13	People of the same sex should have the right to sign a civil partnership		0.447
14	Possession of soft drugs (such as marijuana) for personal use should be decriminalized		0.365
16	The name issue of the Former Yugoslav Republic of Macedonia (FYROM) should be resolved by Greece's acceptance of a composite name with a geographical qualifier		0.381
18	Greece must move to reduce its defense expenditure (e.g. by further closures of barracks)		0.402
26	The second memorandum with the IMF/EU/ECB was necessary to prevent Greece from bankruptcy.	0.569	
27	The policy of economic austerity, although hard, is essential to bring about development in Greece	0.516	
28	The return of the Greek national currency will contribute effectively to the exit from the crisis	0.449	
29	The participation of unelected technocrats in government is beneficial for the rehabilitation of the economy	0.490	
<b>Overall scalability coefficient (H) for each scale</b>		<b>0.498</b>	<b>0.420</b>

**Note:** Item 7 could be scaled with both scales with  $H_i > 0.3$ . As such it was deemed ambiguous and dropped.

**Table 7. Positions of main parties with respect to two latent dimensions, May 2012**

	<b>Economic Left-Right (x)</b>		<b>Cultural Dimension (y)</b>		
	Mean	Standard Deviation	Mean	Standard Deviation	N (cases)
<b>ND</b>	0.6975	0.1500	0.6100	0.2045	549
<b>SYRIZA</b>	0.3111	0.1637	0.2987	0.2044	2582
<b>PASOK</b>	0.6834	0.1359	0.3583	0.1841	354
<b>ANEL</b>	0.4499	0.1716	0.6093	0.2115	1328
<b>KKE</b>	0.1685	0.1491	0.4288	0.1980	808
<b>Golden Dawn</b>	0.4883	0.2130	0.7843	0.2112	345
<b>DIMAR</b>	0.5321	0.1539	0.3031	0.1849	811

**Table 8. Positions of main parties with respect to two latent dimensions, June 2012**

	<b>Economic Left-Right (x)</b>		<b>Cultural Dimension (y)</b>		
	Mean	Standard Deviation	Mean	Standard Deviation	N (cases)
<b>ND</b>	0.7032	0.1485	0.5536	0.1770	135
<b>SYRIZA</b>	0.2846	0.1470	0.3100	0.1848	445
<b>PASOK</b>	0.7150	0.1214	0.3635	0.1490	145
<b>ANEL</b>	0.4035	0.1509	0.6170	0.1601	94
<b>KKE</b>	0.1551	0.1231	0.3651	0.1597	76
<b>Golden Dawn</b>	0.4136	0.1965	0.8410	0.1443	62
<b>DIMAR</b>	0.5484	0.1392	0.3060	0.1549	161



**Table 9: The Policy Space: Greece (May 2012, representative by 2009 vote)**

<b>Item</b>	<b>Question</b>	<b>Dim 1</b>	<b>Dim 2</b>
1	Priority should be given to economic growth even if this leads to a wider gap between rich and poor.	<b>0.605</b>	-0.193
2	Taxes on large corporations should be increased.	<b>-0.446</b>	
3	The extraction and exploitation of the mineral wealth of the country will lead to environmental degradation rather than contribute to economic growth.	-0.259	0.322
4	The installation of solar panels on productive and fertile agricultural land should be prohibited.	-0.202	
5	Privatization will help reduce the deficit.	<b>0.700</b>	-0.158
6	Strong policing in town centers should be implemented to tackle crime.	<b>0.417</b>	<b>-0.615</b>
7	The installation and use of closed circuit cameras in public places (e.g. shopping centers) should be prohibited.	<b>-0.505</b>	0.370
8	In order to maintain order in the cities, the state should take more restrictive measures on demonstrations.	<b>0.686</b>	-0.273
9	Granting Greek citizenship on favorable terms to second generation immigrants will encourage further immigration to Greece.		<b>-0.554</b>
10	Multiculturalism in Greece is a positive phenomenon.		<b>0.742</b>
11	To combat unemployment, workers must accept the new forms of flexible working conditions (e.g. part time jobs).	<b>0.709</b>	
12	Co-funding the universities by private investors will have negative effects on higher education.	<b>-0.580</b>	0.116
13	The introduction of university fees will ensure a better functioning of the public university.	<b>0.569</b>	-0.116
14	Merging smaller hospital and creating large hospitals will lead to a deterioration in the provision of health services.	<b>-0.517</b>	
15	It is feasible to reorganize the public sector without dismissing civil servants.	<b>-0.481</b>	
16	Pay cuts are necessary for overcoming the crisis.	<b>0.615</b>	
17	The proper implementation of the IMF/EU/ECB memoranda will help Greece to overcome the financial crisis.	<b>0.803</b>	0.143
18	The loans provided to Greece have only benefited the banks and lenders.	<b>-0.790</b>	-0.195
19	Signing the memoranda with the IMF/EU/ECB means selling out Greece to foreigners.	<b>-0.798</b>	-0.337
20	The second memorandum with the IMF/EU/ECB was necessary to prevent Greece from bankruptcy.	<b>0.798</b>	0.136
21	The Inter-governmental Fiscal Treaty will not help Europe to overcome the crisis.	-0.350	
22	Greece's exit from the euro zone would help address the economic crisis.	<b>-0.635</b>	
23	Possession of soft drugs (eg, cannabis) for personal use should be decriminalized.		<b>0.522</b>
24	Reducing defence spending (e.g. closing military camps) will provide resources for the welfare state.	0.108	<b>0.518</b>
25	Economic growth can be achieved by liberalizing all of the closed professions.	<b>0.532</b>	
26	Church property should be exempted from taxation so that the church can engage in charitable causes.		-0.320
27	The participation of (non-MP) technocrats in the cabinet will lead to a better management of the economy.	<b>0.644</b>	
28	Greece should strengthen its ties with Israel.	<b>0.428</b>	-0.144
29	The name issue of the Former Yugoslav Republic of Macedonia (FYROM) should be resolved by Greece's acceptance of a composite name with a geographical qualifier.	0.293	<b>0.427</b>
30	Greece should leave the European Union.	<b>-0.700</b>	

**Table 10: May 2012, sampled by 2009 vote, Mokken Scales for ex post Dimensions with Scalability Coefficients ( $H_i$ )**

Item	Question	Scales	
		1	2
5	Privatization will help reduce the deficit.	0.444	
8	In order to maintain order in the cities, the state should take more restrictive measures on demonstrations.	0.442	
10	Multiculturalism in Greece is a positive phenomenon.		0.380
11	To combat unemployment, workers must accept the new forms of flexible working conditions (e.g. part time jobs).	0.424	
13	The introduction of study fees will ensure better functioning of the public university.	0.377	
22	Greece's exit from the euro zone would help address the economic crisis.	0.342	
23	Possession of soft drugs (such as marijuana) for personal use should be decriminalized.		0.361
24	Reducing defence spending (e.g. closing military camps) will provide resources for the welfare state.		0.381
27	The participation of unelected technocrats in government is beneficial for the rehabilitation of the economy.	0.418	
<b>Overall scalability coefficient (H) for each scale</b>		<b>0.409</b>	<b>0.374</b>